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AN  
INAUGURAL DISSERTATION  
ON  
CYNANCHE TRACHEALIS,

COMMONLY CALLED  
*CROUP, HIVES, &c.*

SUBMITTED TO

THE EXAMINATION OF THE

REV. JOHN ANDREWS, S. S. T. P. PROVOST  
(*PRO TEMPORE*),

THE

TRUSTEES, AND MEDICAL FACULTY

OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE 3D DAY OF JUNE, 1805,

FOR THE

DEGREE OF DOCTOR OF MEDICINE.

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BY HENRY M. GRAY, OF VIRGINIA,

MEMBER OF THE PHILADELPHIA MEDICAL SOCIETY.

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Urget necessitas, non scribendi cacoethes.

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TO MY BROTHER,

*EDWIN GRAY,*

I DEDICATE THIS ESSAY.

IT IS ALSO INSCRIBED

TO ROBERT DOWNMAN, M. D.

*OF VIRGINIA,*

AS A SMALL TESTIMONY OF

HIGH RESPECT FOR HIS CHARACTER,

AS A MAN AND AS A PHYSICIAN,

AND OF GRATITUDE FOR THE MANY INSTRUCTIONS AND FAVOURS

CONFERRED ON

HIS FRIEND AND PUPIL,

HENRY M. GRAY.

399023

M<sup>r</sup>. Knighton  
with the best wishes of  
his friend S<sup>r</sup>. G.



TO  
BENJAMIN S. BARTON, M. D.  
PROFESSOR OF MATERIA MEDICA, NATURAL HISTORY,  
AND BOTANY,  
IN THE  
*UNIVERSITY OF PENNSYLVANIA,*  
THIS ESSAY IS DEDICATED,  
AS A TESTIMONY OF RESPECT  
FOR HIS TALENTS AS A PHILOSOPHER AND PHYSICIAN,  
OF ESTEEM FOR HIS PRIVATE CHARACTER,  
AND OF GRATITUDE  
FOR THE MANY DISINTERESTED SERVICES RENDERED  
HIS FRIEND AND PUPIL,  
HENRY M. GRAY.



ON  
CYNANCHE TRACHEALIS,  
&c.

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I HAVE adopted the term Cynanche Trachealis from among the many synonyms\* of the disease in question, because it is in general use, and appears to me equally proper with any that has been used.

No accurate account of this disease was published before the middle of the eighteenth century. It would seem improbable that a disease so strongly marked as cynanche trachealis, and whose pathognomonic symptoms are so peculiarly striking, should have passed unnoticed by the physicians of antiquity, if it had really existed: and yet, when we consider the causes which produce the disease, we ought not, perhaps, to doubt, that it had existed, in some of those countries in which it is now common, many

\* It is the angina polyposa sive membranacea of Michaelis; the suffocatio stridula of Home; the acute asthma of Millar; the spasmodic asthma of infants of Dr. Rush; the peripneumonia trachealis of Darwin, &c. &c.

centuries before it was first noticed in the writings of physicians.

The first regular history of croup was published about the year 1749, by Martin Ghisi, an Italian physician; and the laborious work of Michaelis appeared between thirty and thirty-five years later in the eighteenth century. Since that time, many treatises have been written on the subject.

From all that has been said, it appears to be the received opinion, at present, that there are two distinct species of the disease: one of these is termed *C. trachealis spasmodica*, and supposed to depend solely upon a spasmodic affection of the muscles of the glottis: the other has been called *C. trachealis humida*, by Dr. Rush, and is attended with inflammation and a preternatural secretion of mucus in the trachea, which, becoming inspissated, often assumes the form of a membrane lining that tube.

If I were to be guided only by my own observation, I should have no hesitation in believing it to be always (at least in the beginning) purely spasmodic. I should be led to this conclusion, because, in all the cases I have seen, in the southern parts of Virginia, the disease came on suddenly; no inflammation could be observed, upon inspection of the fauces; there was no soreness of the throat, or difficulty in deglutition; and the disease was always removed in twelve

or fourteen hours, and, in several instances, in less than one hour, by the use of antispasmodic remedies, and without the expuition of any mucous or membranous substance.

But from the writings of authors, and the living testimony of several men eminent in medicine, I cannot hesitate to believe, that there is an inflammatory species of croup, commencing with symptoms of pyrexia previous to the appearance of the topical affection, although such a disease has never come within the sphere of my own observation.

I shall therefore consider the two species or varieties of croup separately: and first, the *cynanche trachealis spasmodica*.

This has been very well defined by Dr. Cullen, as follows :

*C. respiratione difficili, inspiratione strepente, voce rauca, tussi clangosa, tumore fere nullo in faucibus apparente, deglutitione parum difficili, et febre synocha.*

The peculiar sound of the voice, in coughing and in respiration, the great difficulty of breathing, while the power of deglutition remains unimpaired, and the absence of all appearance of inflammation and soreness of the throat, render the diagnosis of this disease perfectly easy. The sound of the voice emitted by

persons labouring under croup has been compared to that of several animals, such as the barking of a young dog, &c. But I think it has been more aptly compared to that harsh and disagreeable sound which is made by certain fowls of the gallinaceous order, when endeavouring to dislodge from the throat a grain of corn, or any other obstructing body of considerable magnitude.

It appears that no age is entirely exempted from the disease. Though it more frequently attacks children, after they are weaned, and before the time of puberty, yet there have been instances of its occurrence during the period of lactation, and sometimes, though less frequently, in the adult. Dr. Home has remarked, that the earlier children are weaned, the more liable they are to the disease\*.

\* Michaelis supposes that croup occurs as often in the adult as in children, but that adults have the power of expectorating the lymphatic exudation before it becomes a solid membrane. But Dr. Cheyne remarks, "if this were the case, we should at least hear the croupy cough, and peculiar voice and breathing, for these precede the formation of the membrane. Children of all ages up to puberty have died of croup, and yet a boy of ten, twelve, or fourteen years of age has as perfectly as he ever can have the power of expectoration."—The Doctor rather supposes its less frequent occurrence in the adult to depend "on that change which happens in the constitution at puberty, and in a more peculiar manner on the change which the upper part of the windpipe undergoes. The alteration of the voice from soft and feminine to firm and manly evinces that a material alteration

No particular climate, season, or state of the atmosphere is necessary to its formation, though it occurs more frequently in the northern than in the temperate climates; in the variable weather of the spring and autumn rather than in the summer and winter months; and in a cold, moist atmosphere more frequently than in a dry, temperate one. From the observations of medical authors, as well as my own, I have no doubt that a damp atmosphere is peculiarly favourable to the production of the disease. It is remarked by Dr. Cheyne, that “ it appears most frequently in low situations, exposed to air passing over large bodies of water, and that it is more especially the disease of sea-port towns.” We are informed by Dr. Crawford, that it formerly prevailed much in Scotland, in an extensive plain, bounded by the river Tay, called the Carse of Gowrie; but he adds, “ *Hæc planities vero nuper desiccata fuit, et rarius occurritur morbus.*”

In the maritime part of Virginia (the part to which my observations have been exclusively confined), it has been observed, that the east wind, which is, in general, very cold and damp there, is peculiarly favourable to the production of croup. While a student of medicine in Portsmouth, Virginia, I witnessed

does take place.” He therefore supposes, “ that the greater degree of tone with which the trachea is endowed enables it to resist those excitements which would have operated on the same organ, in a lax and less perfect state.”



the occurrence of six cases of croup in one week, neither of which was more than a hundred yards distant from a marsh, that extends for a considerable distance into the town. I content myself with mentioning these facts, and shall not undertake an investigation of the *modus operandi* of a damp atmosphere in producing the disease.

Most of the children whom I have seen with the disease, were of a weakly and feminine habit. It always came on in the night, during sleep, after the child had been exposed, the preceding day, to the causes above-mentioned, although he appeared to be perfectly well before going to bed.

In the course of the night, he is awakened with the rough and stridulous cough, so peculiar to the disease; he appears in immediate danger of suffocation, and each inspiration is attended with a shrill, distressing sound. The face is most commonly flushed, and sometimes appears livid. The pulse is quick and frequent, and oftentimes there is a great thirst.

With a continuance and increase of these symptoms, the patient is sometimes carried off in a few hours; at other times, the disease is protracted to the third or fourth day; or, by the exhibition of proper remedies, is entirely removed.



The circumstances mentioned leave no doubt that this species of the disease is purely spasmodic, and, of course, our only indication of cure would seem to be to relieve the spasm.

Having never kept a regular account of any particular case, I can only relate the treatment in general.

1. Bleeding was never employed, nor do I suppose it would be useful in many cases of the complaint.

2. The warm bath was always much relied on, and was always attended with the most beneficial effects. In one or two cases, the spasm was nearly entirely removed in fifteen or twenty minutes after it was applied, and its good effects were always evident.

3. Nauseating dozes of emetics have been found extremely serviceable, as general relaxants; or, if given in such manner as to excite gentle vomiting, they may act *locally* on the glottis.

4. An aqueous solution of asafœtida, taken by the mouth, or injected into the rectum, has been often attended with the utmost benefit\*.

\* Injections of asafœtida have been beneficially employed in the humid, as well as in the spasmodic, form of the disease. But, in order to derive any permanent advantage from this medicine, it should be used in large quantity, whether we give it by the mouth, or employ it in the shape of clyster.

5. The inhalation of the vapour of warm water, or warm vinegar and water, has proved of much service. It is probable, that many cases might be cured by this remedy alone.

6. Friction of the neck, with warm flannel cloths imbued with spirit of wine or aqua ammoniac, has proved a considerable auxiliary to the other remedies.

7. Blistering or purging were never employed. If the disease were of long continuance, a blister would, I doubt not, be a most valuable remedy. But I never saw a case which required such application, the complaint always yielding to the prompt remedies already mentioned.

The prognosis of any disease is difficult: that of croup is peculiarly so. The spasmodic affection, at one time so violent as to threaten immediate suffocation, may sometimes be relieved, in a few minutes. We should always doubt the event, even under the most favourable appearances, and never cease to hope, and use our utmost exertions, while any spark of life remains.

## CYNANCHE TRACHEALIS HUMIDA.

THE other species of the disease is that to which Dr. Rush has given the name *Humida*.

This is known, by making its advances gradually, and commencing with pyrexia and catarrhal symptoms some days previous to the local affection; by its usually coming on in the day time; by being attended with a mucous discharge from the trachea; by not yielding to antispasmodic remedies; and, lastly, by its continuance for several days, without intermission or abatement of the symptoms. When completely formed, the two species very nearly resemble each other; there are, however, some marks of distinction between them. In the spasmodic kind there are evident exacerbations and remissions; but there are none in the humid. In the humid there is a soreness of the throat; the parts appear tumid, and a white mucus is seen upon inspection of the fauces; but none of these circumstances occur in the spasmodic form of the disease.

It appears that this species of the disease belongs more particularly to northern climates. It agrees best with the descriptions of most European writers, and I have been informed by professor Barton, that in this city he has rarely seen any but the true inflam-

matory (or highly febrile) species; whereas, in the southern part of Virginia, every case appears to be entirely spasmodic, and without the least symptom of inflammation.

It is also said to attack the most robust and healthy children, while the spasmodic kind affects almost exclusively the weak and feeble.

This species of croup may terminate favourably in several ways. If blood be liberally drawn in the commencement, the relief is often immediate. Very often, after it has arrived at its height, the sequel appears to be a retrogression of the disease; a perspiration breaks out, the fever and cough decline, and the disease gradually wears away. When it has continued a few days, the child is sometimes relieved by the expectoration of a white viscid substance.

Sometimes it assumes a chronic form, continuing for many days, the patient now and then throwing up portions of a membrane.

Our indications of cure must be varied according to the stage of the disease. During the first, or inflammatory stage, it will be to relieve the inflammation, and thereby prevent the formation of a membrane.

2d. In promoting its separation and expuition after it is formed.

If called in the early stage of the complaint, before the lymphatic exudation has taken place, we should endeavour to prevent its occurrence, by a strictly depleting and antiphlogistic plan. In such cases, bleeding should always be employed in proportion to the violence of the disease, the constitution of the patient, &c. The jugular veins are usually turgid with blood, and it is more easy to let blood from them than from the arms of children. In general, four or five ounces of blood will be a sufficient quantity from a child of two years old. If the opening of a vein be not admissible, it will be very proper to apply eight or ten leeches to the trachea; they should be laid on, just below, and in the immediate vicinity of, the thyroid cartilage.

It is asserted, by some writers, that this species of croup, also, is often partially spasmodic\*, and that the warm bath and emetics are indicated in it as well as the other kind.

\* “ But in the beginning, the tumor and inflammation (although I suspect they are then much more considerable than afterwards) will hardly be thought to afford a sufficient explanation of the Orthopnea. I must therefore suppose, that along with this fulness, and perhaps in some measure occasioned by its stimulus, there is a spasmodic constriction of the larynx. This I am inclined to believe, because although, in the first stage, I have never seen an intermission in the disease, unless in consequence of bleeding, I have observed the breathing, which is always laborious, performed, at particular times, with incomparably more distress.”

*Cheyne's Essay on Cynanche Trachealis.*

Purgative medicines, too, as a part of the general depleting plan, should be used according to circumstances. The application of blisters and sinapisms to the neck has been recommended, and, from their good effects in similar diseases, there is no doubt, that, in many cases, they will be useful.

From reasoning *a priori*, we should infer, that the cold bath would be a valuable remedy, and its good effect has sometimes been confirmed by experience. My fellow-student, Mr. Charles Lewis, has favoured me with an account of his own case, in which it was successfully employed.

When about fourteen years of age, he was awakened one morning with croup, after having been exposed, the preceding day, to the cold, and wet feet. Much alarmed, he ran out, in his shirt, although the ground was covered with snow, and threw himself into a bath of cold water, which was near the house.

He remained in it some time, was much relieved, and, in a few hours, the disease was totally removed.

If, notwithstanding the application of the above remedies, the cough and difficulty of breathing continue, while there is a remission in the phlogistic appearances, such as a change of the florid colour of the countenance to a livid, the pulse becoming smaller and more feeble, and the presence of a sediment in



the urine, we judge that the inflammatory stage is over, and that an effusion into the trachea has taken place, forming what has been called the complete or purulent stage of the disease, and, laying side the remedies of the inflammatory stage, proceed to our second indication, viz. to remove the inspissated mucus from the trachea.

The depleting plan, which was pursued during the inflammatory period, is now to be desisted from, and the patient supported by moderately stimulating medicines, and his bowels kept gently open.

For the purpose of detaching the membrane from the trachea, certain sialagogue medicines have been used, the chief of which are mercury and the root of *polygala seneca*, or *seneca snake-root*. These medicines have been supposed to effect the separation, by increasing the secretion of saliva and the mucus of the trachea, and thus interposing a fluid between the two. The *seneca*, as one of the external sialagogues, and as acting immediately upon the part, appears to be, in many instances, the preferable remedy. When exhibited in the form of decoction, it has been attended with the best effects. The decoction should be sufficiently strong to excite a sense of pungency in the mouth, and to occasion an increased flow of saliva. In general, a pint of water added to an ounce of the powdered or bruised root, and boiled down to half a pint, will be sufficient. Of this a tea-

spoonful or more should be given at a time, and the dose frequently repeated, so as to keep up a constant stimulus in the mouth. If it vomits, we often experience from this operation of the seneca, all the advantages of the ipecacuanha, and other emetics: indeed, the seneca never so completely relieves the patient, as when it occasions pretty free vomiting and expectoration.

Proceeding in this manner, the membrane will often be loosened in the course of a few hours, and thrown out by coughing. Sometimes it is swallowed, and passes off by stool.

In the chronic form of croup, mercury given in addition to the seneca may be of service. But, in a plurality of cases, the seneca is to be preferred, because it produces that effect immediately, which cannot be expected from mercury in less than two or three days at least.

When all other remedies have failed, it has been proposed, as a *derniere resort*, to perform the operation of tracheotomy, and to extract the membrane with a pair of forceps.







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